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TRANSLATIONS ON EASTERN EUROPE
SCIENTIFIC AFFAIRS
No. 532

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INTERNATIONAL AFFAIRS

CZECHOSLOVAK-SOVIET SCIENTIFIC COOPERATION DESCRIBED

Bratislava NEDELNA PRAVDA in Slovak No 49, 3 Dec 76 pp 6, 7

[Article by Ivan Krcmery and Jozef Luc: "The Bushy Tree of Cooperation"]

[Text] What socialist society expects of science is by no means little: ever-deeper and bolder research of new processes, more-active elaboration of the new knowledge gained through the development of science and technology, analysis of the arising problems, and finally their optimal solution in the interest of further improving mankind's life.

The mission and function of science and scientists in building socialism has been characterized succinctly by Leonid I. Brezhnev, secretary general of the CPSU Central Committee, when at the ceremonies marking the 250th anniversary of the founding of the Soviet Academy of Sciences he said; "Socialism and science are inseparable in the sense that science is one the causes of socialism's victory. Only socialism has made it possible to utilize scientific knowledge in the interest of mankind, and to uncover the creative power and abilities in which every nation abounds. Socialism and communism can be built successfully only by utilizing the latest advances in the natural and the social sciences."

Professor Norbert Szuttor, CSc, deputy secretary general of the Slovak Academy of Sciences, chose this quotation as the motto of his speech in which he recalled the glorious traditions of Soviet science to more than 100 scientists of the Slovak Academy of Sciences, and representatives of research institutes and higher educational institutions. The auditorium in the Academy complex on Dubravska Road was again nearly full. Here you encountered mostly representatives of the technical sciences: electrical engineers, architects, physicists, chemists, and also astronomers, pharmacologists, and others. The topic of the seminar, sponsored by the Czechoslovak-Soviet Friendship Society, Section for the Propagation of Soviet Science and Technology, was cooperation between institutes of the Slovak Academy of Sciences, and institutes of the Soviet Academy of Sciences.

How has this cooperation developed from the first hesitant contacts in the beginning of the 18th century, when the famous Academy of Sciences and Arts was founded in St Petersburg, to the qualitatively new and intensive ties among scientific institutions within the framework of CEMA? We will probably be

surprised to hear that in 1928, not quite 50 years ago, the Soviet Academy of Science had only nine institutes. At present nearly 40,000 scientists are working under the auspices of the Soviet Academy of Sciences. The scientific centers of the Soviet Academy likewise have undergone an unprecedented growth. Academies of sciences have been formed in all union republics, and the Soviet Academy of Sciences has centers in the Far East and in Siberia. Both centers have gained international recognition with their scientific results.

The ties of the Slovak Academy of Sciences with Soviet scientific work stations are oriented primarily on greater participation in multilateral cooperation with the CEMA Complex Program, on the activities of the committees, and on the further intensification of bilateral cooperation. During the past five-year period, scientific-research relations between the two supreme scientific institutions intensified further. These relations were characterized by the efforts of the two academies to achieve systematic collaboration and cooperation in research and development, on the basis of both general and concrete agreements. However, long-term relations are beginning to assert themselves increasingly in the solution of the fundamental long-range tasks of basic research.

Common Objectives of Biologists and Ecologists

The Slovak Academy of Sciences Institute of Experimental Biology and Ecology has been cooperating for a long time with work stations of the Soviet Academy of Sciences. The main objective of this cooperation is to gain a complete overview of the living environment's biological component. Therefore research is oriented on exploring Slovakia's vegetation and its relationship with the environment, the study of the physiological processes in plants, of the effects of industrial pollutants, of the quality of the sources of water, etc. Naturally, the socialist countries are pooling their scientific potential to faster obtain information that is of higher quality.

With the Soviet Academy of Sciences Institute of Hydrobiology, Kiev, our institute has concluded an agreement to study the biological activity of microorganisms in water. The subject of research is particularly the interaction of microorganisms when streams become polluted with sewage water. Both institutes are members of the International Association for Research of the Danube. Our institute is cooperating with the Kiev Botanical Institute and with the All-Union Institute of Plant Protection, Leningrad. They jointly are participating actively in research of the so-called Carpathian arc.

The Scale of Scientific Cooperation

Participation of the Slovak Academy of Sciences in solving the tasks of the CEMA Complex Program is a significant part of multilateral scientific cooperation among the socialist countries. Seventeen institutes of the Slovak Academy of Sciences are participating in the solution of 96 topics that are included in 30 problems. Twenty-one of these problems are coordinated by the CEMA Committee for Scientific and Technical Cooperation. The other problems

are coordinated by permanent committees of CEMA, such as the Committee for the Peaceful Use of Atomic Energy, the Committee for Agriculture, the Committee for the Chemical Industry, the Committee for Construction, etc.

Within the framework of the CEMA Complex Program, there are two coordination centers at the Slovak Academy of Sciences: one for the protection of ecosystems and the environment, the other for malignant tumors. Both coordination centers have effectively contributed toward the elaboration of long-range and purposefully coordinated research directions in their respective fields.

Under the five-year plan just ended, the Slovak Academy of Sciences was entrusted with establishing a work station that would function as the principal designer of the system of small electronic computers, within the framework of the CEMA Complex Program. With the acceptance of this task, the Slovak Academy of Sciences now ranks among the work stations that are helping to solve key tasks of the socialist community's economic growth. Another important field in which we maintain ties with work stations in the Soviet Union is cooperation on the peaceful use of cosmic space, within the Intercosmos Program. This cooperation provides an opportunity for our work stations to help solve on a high scientific and technical level important scientific problems and to contribute to qualitatively new fields such as space physics, to meteorology, biology and medicine. By exchanging information and result, on the other hand, our scientific workers are performing their international duties stemming from the common social objectives of our socialist system.

Wide Horizons of Chemistry

Prominent Soviet scientists and scientific work stations helped establish the present orientation of the Slovak Academy's Institute of Inorganic Chemistry and formulate its tasks. These scientists were particularly Academician V. I. Spitsyn, director of Soviet Academy of Sciences Institute of Physical Chemistry; corresponding member P. P. Budnikov of the Mendeleyev Institute in Moscow; Academician A. Grinberg of the Leningrad Polytechnical Institute, and others. The more than 20 years of friendly relations are the foundation of the long-term agreements that account for up to 70 percent of the joint work plan, and also of other coordinated cooperation.

The Sixth Five-Year Plan is giving the institute even wider room for cooperation. It will be developed, for example, in the fields of silicate chemistry and coordination chemistry, particularly on the problem "The Theoretical Foundations of Chemical Technology." The objective is the more efficient utilization of the raw material base in both countries for the production of cement and refractory materials, and also for the further processing of rare-earth compounds, catalysts, and natural hydrosilicates.

Common Interests in Dubna

The Slovak Academy's Institute of Electrical Engineering began its cooperation with Soviet institutes in the early 1960's, when the institute's

future specialization and the orientation of the training of its personnel were being decided. Cooperation assumed concrete form especially with the Joint Nuclear Research Institute, Dubna. Several of our scientists helped in Dubna to design particle counters that are being used in nuclear research. Cooperation gradually broadened. The research problems were solved of measuring and mapping the magnetic field in electromagnetic particle accelerators; superconducting magnets and magnetic systems were designed and built, and so on. At present our cooperation with the Joint Nuclear Research Institute, Dubna, is the most extensive cooperation between a Slovak and a Soviet institute. It has become customary to send two or three scientists from Bratislava to Dubna for long study tours. Our institute is cooperating also with the Institute of Physical Problems, Moscow, with the Institute of Atomic Energy imeni Kurchatov, and with others.

A good example of integrated scientific cooperation is cooperation with the Joint Nuclear Research Institute, Dubna, on the peaceful use of nuclear energy. Internationally coordinated division of labor enables the member nations to participate in the solution of tasks that they would be unable to finance severally from their own resources. The institute in Dubna has at its disposal special research equipment, large collectives of highly trained scientists; it is able to master also exceptional investments and high operating costs.

Multilateral cooperation among the socialist countries' academies of sciences broadened and intensified in recent years. Organizationally this cooperation has been divided into 16 committees, for the technical, biological and medical, and social sciences. The Slovak Academy of Sciences is represented on every committee. It is interested particularly in neurophysiology and higher nervous activity, within the framework of the Intercosmos and Intermozg [Inter-brain] programs; also in research of interplanetary matter, geosyncline processes and the formation of the earth's crust, within the Planetary Geophysics Program.

Cybernetics Is Dominating the Field

Soviet scientific work stations are of decisive importance to the Slovak Academy's Institute of Engineering Cybernetics. There are tens of Soviet institutes in this field, and their scientific level is outstanding. For decades there have been schools around scientists of world renown such as Professor Lyapunov, Academician Lurie, Professor Popov, and others. Many of our scientists were on extended study tours at the Soviet Academy of Sciences Institute for the Problems of Control, in Moscow. Cooperation with this institute strongly influenced the orientation of our institute in the field of control theory.

The second largest Soviet institute in the field of cybernetics is in Kiev. Its results have been used in our country in designing extremal controllers and in applying the methods of control theory to continuous production processes. Also the computer centers of the Soviet Academy of Sciences, in Moscow and in Novosibirsk, helped our institute with information and data for the solution of problems. With the computer center of the Soviet

Academy's Siberian branch our institute concluded an agreement for cooperation on several topics. The Soviet Academy of Sciences Institute of Mathematics, in Novosibirsk, has offered to cooperate with our cyberneticians on the theory of computer systems that are highly reliable and have a high degree of parallel operation. We are cooperating closely also with the Institute of Control Computers, in Moscow, on the project of the system of small electronic computers.

From Silicates to Vascular Surgery

In bilateral cooperation with the Soviet Academy of Sciences, the Slovak Academy of Sciences is participating in the solution of 62 topics within 36 problems. This covers such important fields as research of semiconductors, thin films, superconductors and their applications, the theory and design of prefabricated components, the study of polysaccharides and of their biological activity, research of the microcrystalline structure of cellulose, research of the destruction and modification of high-molecular materials, etc. In the social sciences the topics include the historical development of Czechoslovakia as a part of world history, the significance and place of traditions in the further development of our society, research of socialist society, of its structure and political forms, the basic categories and laws of economic growth during the construction of a socialist society, etc.

Scientific relations are developing fruitfully also with the Soviet Academy of Medical Sciences. The Slovak Academy of Sciences is participating in the solution of 15 tasks that are oriented particularly on molecular virology, morphology and immunology, prophylaxis, diagnostics, on the production of certain sera, etc. In the field of pharmacology there is particularly the study of pharmacokinetics, the study of biopharmacy, and the study of the microorganisms' resistance to antibiotics. In the field of experimental biology, cooperation is developing fruitfully in vascular surgery and heart surgery.

The astronomical observatory on Skalnaté Pleso is renowned for its discovery of new comets and the measuring of their positions. The observatory is cooperating also with Soviet work stations. This cooperation involves joint observations within the framework of a bilateral agreement with the Institute of Theoretical Astronomy in Leningrad, and more recently under the Inter-cosmos Program in particular. Several scientific publications have resulted from this cooperation. Already 35 prominent Soviet scientists from 21 different institutions have visited our observatory.

Great Objectives and Opportunities

The Slovak Academy of Sciences maintains topically oriented scientific cooperation also with the All-Union Academy of Agricultural Sciences imeni V. I. Lenin. This cooperation is on solving the problems of fermentation processes, on explaining the essence of crop resistance to plant diseases and parasites, and on other problems.

This brief outline does not cover by far all examples and aspects of cooperation with Soviet work stations. The presented examples merely convey how bushy is the tree of mutual cooperation and what rich fruits it produces. And although the contributions of scientific knowledge to our national economies are by no means small, both sides are aware that scientific cooperation still has considerable reserves. What are these reserves? From the conferees at the seminar we heard many examples of fruitful mutual cooperation, and also about the reserves. They exist particularly in the intensification of the level of integration, in the specificity of the set objectives, and in the greater efficiency of all relations and cooperation. It will be necessary and even essential to gradually utilize these reserves. This is demanded by the interests of greater economic efficiency--in our economy as well as in the economies of the other socialist countries--and also by the interests associated with attaining the joint political, social and economic objectives of the entire socialist community.

1014

CSO: 2402

BULGARIA

UNIQUE METEOROLOGICAL INSTRUMENTS INVENTED

Sofia TEKHNICHESKO DELO in Bulgarian 29 Oct 76 p 2

[Article by Zdravko Marinov]

[Text] The Plant Physiology Institute of the Bulgarian Academy of Sciences has developed a new meteorological instrument to measure precipitation -- a rain-and-hail gage. It has been recognized as an invention. Unlike all rain gages hitherto created in the world, the new instrument operates on an entirely new principle, making it possible during a hail storm to measure not only the total amount of precipitation, but also rain and hail separately. The results obtained by the instrument are of real value and can be used for scientific and practical purposes in the sphere of meteorology, insurance and agriculture. The rain-and-hail gage has been introduced in the experimental fields of the State Variety Commission.

The same institute has also developed a unique meteorological apparatus, likewise an invention, which enables hailstones, separated from rain, to be sorted by size and, accordingly, the amount of each fraction to be measured.

Both inventions serve to obtain more complete physical characteristics of every hailstone that falls and therefrom to establish the existing laws in nature that govern this elemental disaster.

6474

GSO: 2202

BULGARIA

SHAKING APPARATUS INVENTED

Sofia TEKHNICHESKO DELO in Bulgarian 29 Oct 76 p 2

[Article by Zdravko Marinov]

[Text] The Central Instrument Manufacturing Center of the Bulgarian Academy of Sciences has developed a shaking apparatus which assures far greater capability than any hitherto in the cultivation of microbiological and biological microorganisms without the need for any special quarters or laboratories.

The apparatus permits the cultivation process to be carried on at a temperature from 25 to 50° C on the same oscillating panels regardless of the temperature of the ambient environment. This is an important advantage whereby the working cycle is accelerated many times and the basic economic effect is realized more rapidly.

Application of the instrument is very extensive (various spheres of the dairy industry; pharmaceutical, food and gustatory industry, as well as in industrial microbiology, biochemistry and pharmacology).

6474

CSO: 2202

BULGARIA

AUTOMATIC DEVICES FOR MEASURING AND SORTING PASSIVE ELEMENTS INVENTED

Sofia TEKHNIЧЕСКО ДЕЛО in Bulgarian 29 Oct 76 p 2

[Article by Zdravko Marinov]

[Text] The Electronics Institute at the Development and Application Base of the Unified Science and Personnel Training Center for Physics and Physicotechnical Problems under the Bulgarian Academy of Sciences has developed a series of automatic devices for automatically measuring and sorting passive elements. The automatic devices are an invention of the academy.

As a result of the new measurement method that has been developed, a number of such automatic apparatuses have been designed: "MI-619/A," "MI-619/20," "MI-619/MS" etc. Their basic characteristics are as follows: great precision, wide range of measurements, high speed, high reliability, and automation of the measurement process.

The effect of their adoption is manifested in a reduction of rejects of output as a result of more precise measurement of resistors and an increase in labor productivity besides.

Automation of production has begun at the "Bratya Chengelievi" [Chengeliev Brothers] Plant in Aytos, and the first three automatic devices have been introduced. This year, eight more such devices will be made by the Bulgarian Academy of Sciences and handed over for introduction at the plant.

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CSO: 2202

BULGARIA

ANALYZER-DIFFERENTIATOR DEVELOPED

Sofia TEKHNICHESKO DELO in Bulgarian 29 Oct 76 p 2

[Article by Zdravko Marinov]

[Text] The Solid-State Physics Institute of the Bulgarian Academy of Sciences has developed an analyzer-differentiator intended for research on the electrophysical and photoelectric characteristics of semiconductor structures used in the semiconductor industry in the manufacture of MOS transistors and MOS-integrated circuits.

The device possesses high technical specifications and consists of an oscillator, resonance amplifier, detector, differential amplifier, stabilizer etc.

Besides its scientific effect, the device also has an economic effect when employed under industrial conditions.

6474

CSO: 2202

BULGARIA

MOESSBAUER SPECTROMETER DEVELOPED

Sofia TEKHNICHESKO DELO in Bulgarian 29 Oct 76 p 2

[Article by Zdravko Marinov]

[Text] The Institute of Nuclear Research and Nuclear Energy of the Bulgarian Academy of Sciences has developed a specialized Moessbauer spectrometer (an instrument for rapid quantitative analysis of the iron-containing components in iron compounds).

The instrument possesses high technical specifications and consists of an electromagnetic modulator, gamma-spectrometric part and electromagnet.

In addition to scientific research work, the spectrometer has wide practical application.

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CSO: 2202

BULGARIA

PRODUCT LINE OF GABROVO ELECTRONICS PLANT DESCRIBED

Sofia TEKHNIЧЕСКО ДЕЛО in Bulgarian 29 Oct 76 p 5

[Unattributed article: "Gabrovo Industrial Electronics Plant Produces More Than 60 Types of Electronic Equipment"]

[Text] The task of continuously increasing production efficiency and assuring high-quality output is closely linked with the problems of raising the technical level of production, the updating of technologies and the introduction of fundamentally new technologies.

High-frequency electrothermics and ultrasonic treatment are some of the most highly perfected methods by means of which many of the crucial technological problems in industry are solved.

The Gabrovo Industrial Electronics Plant is the sole producer in our country of high-frequency electrothermal devices and ultrasonic equipments of power electronics.

Adapting itself to the heightened demands and needs of the country and exports, the plant has developed a wide list of these products (more than 60 types). These are a line of high-frequency generators for induction heating with a capacity from 10 to 60 kilowatts in a package with machines for surface tempering and thermal treatment, a line of thyristor transducers with power from 100 to 400 kilowatts in a package with machines for space heating of forging-and-pressing billets, induction crucible furnaces for heating ferrous metals with capacity up to 600 kilograms, pipe-bending machines for pipes with a diameter up to 300 millimeters.

Also among the plant's output are dielectric-heated plastic-welding machines with power from 100 watts to 12 kilowatts, devices for warming up pelletized compacting powder for heating and drying various materials, microwave ovens intended for public food service, devices for welding polyethylene foil, ultrasonic generators and various equipments for cleaning and removing oil from metallic and nonmetallic parts. The series of thyristor transducers for regulating the revolutions of d-c motors for

capacities from 1 to 250 kilowatts, thyristorized voltage regulators etc. are also finding a definite place in the market.

All these products have been got into production at a modern technical level by the creative staff of the plant and are finding a good reception not only in our country but also in other socialist countries (the USSR, Poland, Hungary, GDR, Romania and the Korean People's Democratic Republic).

The good reception of high-frequency electrothermal devices, ultrasonic equipments and power-electronics equipment is due to two factors: first, a number of technological problems in individual sectors of industry are solved in a most effective way by means of the electronic equipment produced at the Gabrovo Industrial Electronics Plant and, second, almost all the equipment, if used efficiently, pays for itself in less than a year, and some of it in even a few months.

At this year's Plovdiv International Fair, the Industrial Electronics Plant showed a few of its latest electronic equipments. These were part of the line of type UZP-1000, UZP-2500 and UZP-4001 plastic-welding devices. Of special interest is the last-named of these (the UZP-4001), which consists of an air-cooled thermionic oscillator with capacity of four kilowatts and a semiautomatic hydraulic press with rotating mechanism with four operator's positions intended for the series production of items made of polyvinyl chloride foil. The plant is also attracting the attention and interest of specialists with the exhibited "Termoelektra" apparatus for the welding of polyethylene foil, which is equipped with pincers for closing various packagings; with the type KM-2000 microwave oven, put into production and shown for the first time in the country, intended for the defrosting of precooked foods or for rapid cooking of foods in restaurants, snack-bars, campgrounds and other public food-service institutions; and with the new ultrasonic device intended for the cleaning of precision machinery and parts, which is especially good for service centers and workshops.

In addition to its standard equipment, the plant devises technologies and special devices in the spheres of high-frequency electrothermics and ultrasound.

The demand for industrial electronic equipment, which increases every year, has brought about the rapid development of the plant during its 15-year history. By the end of the Seventh Five-Year Plan, the volume of its production will more than double as a result of impending reconstruction and modernization.

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CSO: 2202

HUNGARY

HIGHLIGHTS OF CEMA TECHNICAL-SCIENTIFIC COOPERATION NOTED

Budapest NEPSZAVA in Hungarian 28 Nov 76 p 7

[Excerpts] Academician Vladimir Kirillin, chairman of the CEMA Committee for Scientific-Technical Cooperation, has revealed in one of his statements that 300 technical research problems are being solved through the multi-lateral cooperation of the member nations. More than 70 multilateral contracts have been signed for the joint solution of scientific-technical problems in the fields of fuel and power, metallurgy, the chemical industry, geology machine manufacturing, and agriculture and forestry. Altogether 1,700 scientific institutions and enterprises of the CEMA countries are participating in the fulfillment of these agreements. Thirty coordinating centers, joint institutes and organizations have been established to coordinate the scientific-technical research. The Joint Nuclear Research Institute operates in Dubna; the International Center for Mathematics, in Warsaw; the International Laboratory for Strong Magnetic Fields and Low Temperatures, in Wroclaw.

The results of the work are significant. More than 100 new installations, machines, 70 new technologies and 50 types of material and products have been developed. Outstanding among these are welding processes performed with ultra-sound and electron beam, and gas heaters which reduce gas consumption by 3-5 percent. The Central Physics Research Institute [of Hungary] undertook an important role in determining the neutron physical data required for planning 1,000-megawatt nuclear power plant blocks. The coordinated CEMA plan, now prepared for the first time, contains those especially important research tasks which the member nations have undertaken to solve between 1976 and 1980. Researchers are seeking solutions for the most expedient use of power and fuel supplies, the more efficient production of protein, and the protection of metals from corrosion.

Although research promotes cooperation among the member nations, there are certain problems in broadening scientific contacts. Soviet researchers have pointed out that the exchange of information among the scientific institutes of the member countries is unsatisfactory. Consequently there is still much duplication of research. The institutes are not sufficiently interested in

broadening cooperation. So far it has been possible to achieve harmony in research only in the framework of joint programs. In many cases the results of technical research are used late. All this is an indication that in developing integration it is necessary to investigate primarily social-economic characteristics in addition to technical-economic relationships. Scientific-technical cooperation and integration can proceed more rapidly and effectively if the theme of scientific research is extended to include investigation of the social processes connected with integration. This view has greatly expanded the field of joint research. In addition to technical research, priority has been given to the investigation of social science issues. As integration develops, specialists are becoming involved in matters related to organization, leadership and management, jurisprudence and sociology.

CEMA recently established a series of new joint economic organizations, such as Interatomenergo and Interelektro, and a legal framework must be set up for them, legal-organizational limits must be defined, and their relation to individual countries and to other CEMA institutions must be regulated. Increasing relations with third nations result in new problems of social science. The institutional and organization system suitable for regulating the connection between CEMA and other integrational organs or CEMA and countries outside such a collective must be worked out.

A series of joint actions by scientists of the member countries has produced noteworthy results in harmonizing social science research. A book entitled "Theory and Practice of Developed Socialist Society" was published in 1976. It was the work of the scientists of five socialist countries. A book evaluating socialist realism and socialist literature was also published this year.

The academies of sciences of the member nations resolved in May to establish a mutual international information exchange system in the field of the social sciences. The Russian abbreviation for it is MISZON. The purpose of the system is to avoid duplication of information collection and processing.

Although joint research is progressing apace, a series of issues requires further investigation and must be solved. One of the greatest hindrances to cooperation is the fact that the different pricing and currency systems in the countries make it exceptionally difficult to assess the effectiveness of economic relations. Soviet economist Oleg Bogomolov has pointed out that the CEMA countries' methods of price calculation, the method by which the effectiveness of reciprocal shipments transacted on the basis of specialization and cooperation agreements is measured, must be perfected. The perfection of the CEMA currency, financial and credit systems would be of great advantage in the further development of the joint planning and economic guidance system.

HUNGARY

DIRECT MAN-COMPUTER COMMUNICATION BEING RESEARCHED

Budapest NEPSZABADSAG in Hungarian 23 Nov 76 p 10

[Excerpts] Specialists in the field of computerization are currently working on three aspects of direct man-machine communications. The first of these involves vocal response--when the computer replies to a question in the form of human voice. The second is voice recognition--wherein the computer understands the words addressed to it on the basis of its built-in vocabulary. The third is computer identification of speaker. This means that the computer not only understands vocal instruction, but will accept instruction only from the designated person. There are already examples of computers which carry out tasks in response to human vocal instructions. An R-10 computer used for this purpose is currently operating in Hungarian under laboratory conditions. It is true that the computer has a total vocabulary of only 12 words.

The third task, computer identification of speaker, is relatively most difficult and furthest from being solved. A group of Hungarian researchers are taking a line different from that pursued abroad for this purpose. The voice sample is converted into a series of digital or numerical signals and the program of the machine processes these. Consequently, it is unnecessary to teach [the machine] many languages or even a single one. At the same time it can understand meaningless words or noises. However, with this method the Hungarian researchers are not striving to solve the third task, identification of the speaker, but only the first two. Thus Hungarian computers will "converse with anybody."

CSO: 2502

HUNGARY

BRIEFS

NEW HIGH-PROTEIN WHEAT--A new, high-protein variety of wheat has been bred by the Grain Breeding Research Institute [Gabonatermesztési Kutató Intézet]. Tentatively known as GKI-K2, the wheat has an average annual yield of 51.5 quintals per hectare. Its protein content over a 3-year period was 16.2 percent. It has a strong stem between 70 and 80 centimeters long. Its ability to withstand cold is good; it has a reliable resistance to drought and is not susceptible to fungus diseases. GKI-K2 has a high hectoliter weight and produces firm kernels which mill well. [Budapest MAGYAR MEZOGAZDASAG in Hungarian 1 Dec 76 p 8]

CSO: 2502

POLAND

POLISH ACADEMY OF SCIENCES ACTIVITIES, PERSONNEL

Warsaw NAUKA POLSKA in Polish No 9-10, Sep-Oct 76 pp 205-232

[Excerpts] Agreements on Scientific Cooperation

Between 23 and 26 March 1976 discussions took place in Warsaw of representatives of the Department of Agricultural and Silvicultural Sciences of the Polish Academy of Sciences (PAN) and Academy of Agricultural and Silvicultural Sciences of the Socialist Republic of Romania on the subject of the extent of cooperation for 1976-1980. During discussions it was established that the cooperation of both institutions will be concentrated on subjects dealing with genetic and physiological foundations and technology of the enhancement of the productivity and quality of cultivated plants, among other things of potatoes, sugar beets, corn, as well as on genetic and physiological foundations of the increase in the productivity of animals. Within the framework of this subject matter the scientific institutions which conduct joint studies will work out concrete programs of cooperation for a five-year period, which will take into account the forms of cooperation, mutual obligations and executors, and the deadlines of the execution of work. These programs should encompass a full cycle of works, beginning with the commencement of investigations down to the achievement of results. The plans should be approved by the leaderships of both partners.

Within the framework of the coordinated subject matter both parties will exchange, on the basis of agreements not involving foreign exchange, scientific workers for a period of 25 weeks annually for short-term sojourns and for a period of 6 months annually for longer sojourns for the purpose of the participation in joint investigations. Besides the agreed limits, the parties can delegate their workers for the purpose of participation in domestic and international scientific events organized in both countries.

The Protocol on Scientific and Technical Cooperation between the Department of Agricultural and Silvicultural Sciences of PAN and the Academy of Agricultural and Silvicultural Sciences of the Socialist Republic of Romania was signed on 23 March 1976 by the secretary of Department 5 of PAN, Academician Bohdan Dobrzanski, and by the vice president of the Academy of Agricultural and Silvicultural Sciences of the Socialist Republic of Romania, Academician Grigore Obreanu.

On 1 April 1976 there was signed in Budapest the Protocol on Scientific Cooperation between the Department of Agricultural and Silvicultural Sciences of PAN and the Main Administration for Scientific Investigations and Specialized Education of the Ministry of Agriculture and Food Industry of the Hungarian People's Republic for the period of 1976-1980.

In accordance with stipulations of the protocol, cooperation between the two institutions will be based on the subject-matter plan of cooperation, which constitutes an annex to the protocol and encompasses five problems, dealing among other things with the optimization and consumption of protein, physical and physicochemical properties of soils and cultivated plants as well as genetic and physiological bases of the enhancement of the productivity of animals. The institutes of both parties conducting joint investigations will coordinate the plans of cooperation for 5-year periods, in which they will determine mutual obligations, executors, and the time of the conduct and termination of investigations.

To conduct joint investigations and to exchange experiences and participation in scientific meetings, both parties will exchange annually their workers for a period of 25 weeks on the basis of agreements not involving foreign exchange.

Besides the agreed limits both parties will receive scientific workers delegated for other purposes.

The protocol was signed by Corresponding Member of PAN Antoni Rutkowski, and by Dr Balint Saloci.

During 7 and 14 April 1976 preliminary talks took place in Havana between the representatives of the Polish Academy of Sciences and the Cuban Academy of Sciences on the subject of scientific cooperation of both institutions for the 1976-1980 period. During conversations it was established that both parties will apply among other things the following forms of cooperation: the conduct of joint investigations, admittance to scientific institutions of PAN of workers of the Academy of Sciences of Cuba for the purpose of training and obtaining scientific degrees, and the exchange of scientific publications.

Both parties will perform joint investigations on applications of ultrasound, on flora and fauna, on geographico-economical regionalization, and on the study of the progress of human knowledge. The subject matter of cooperation in the field of social sciences will be coordinated separately. Furthermore Polish scientists will conduct in Cuba investigations connected with the compilation of a geological map of the Matanzas Province.

Scientific institutions conducting joint investigations will work out detailed plans of cooperation, which will be annually brought up-to-date and approved by the authorities of both academies. Both academies will annually receive scientific workers of the other party in accordance with

needs resulting from the realization of the subject matter of cooperation. In the first place there will be realized trips for the purpose of the conduct of joint investigations and the training and improvement of scientific cadres. The Polish Academy of Sciences will send to Cuba its scientific workers for the purpose of the organization of scientific investigations and delivery of lectures also in the fields not comprised in the plan of cooperation. Both academies will also mutually invite scientists of the other party for participation in scientific ventures.

The Protocol on Scientific Cooperation between the Polish Academy of Sciences and the Academy of Sciences of Cuba was signed on 13 April 1976 by Scientific Secretary of PAN Jan Kaczmarek and President of the Cuban Academy of Sciences Zoilo Marinello Vidaurreta.

On 29 April 1976 the Agreement on Scientific Cooperation between the Polish Academy of Sciences and the Austrian Academy of Sciences as well as the Protocol on Cooperation for the Period of 1976-1977 were signed in Vienna.

In accordance with the Agreement the cooperation between the two academies will comprise: the conduct of joint investigations; the exchange of scientific workers for the purpose of the conduct of joint investigations, training of cadres and delivery of lectures; the organization of scientific ventures on themes which are the subject of cooperation; exchange of information concerning scientific policies and management of scientific research. Both parties have coordinated the subject matter of joint investigations, which constitutes the annex of the agreement.

In the years 1976-1980 the main directions of cooperation will be among other things the relations between Poland and Austria within the compass of history (political, economical and cultural); molecular biology; protection and shaping of environment; neurophysiology and neurochemistry, chemistry and physics; mathematics and automation and mechanics. The scientific institutes with the established subject matter as a basis, will coordinate detailed plans of cooperation determining the subdivision of research tasks and time of their realization, persons responsible for cooperation, and extent of the exchange of scientific workers.

In accordance with the Protocol on Cooperation, both parties will exchange annually, on the basis of agreements not involving foreign exchange, the scientific workers for periods of 40 weeks and 12 months. Priority will be given to workers carrying out joint investigations.

The agreement was concluded for 5 years and will be extended for another 5 years if not renounced by one of the parties one year before the expiration of its validity.

Both documents on scientific cooperation between PAN and the Austrian Academies of Sciences for the years 1976-1977 have been signed by Vice President of PAN Witold Nowacki and President of the Austrian Academy of Sciences Herbert Hunger.

On 24 to 30 April 1976 negotiations took place in Warsaw between a delegation of PAN and the secretary for foreign relations of the British academy on the subject of coordination of the Agreement on the Cooperation between both parties for the years of 1977-1981. On the basis of existing experience both parties have stressed mutual interest in the further development of cooperation, especially in the realization of mutual investigations and the training and improvement of scientific cadres.

On 30 April 1976, Vice President of PAN Jan Szezepanski and Secretary for Foreign Relations of the British Academy A. G. Dickens signed the agreement on scientific cooperation between the Polish Academy of Sciences and the British academy for the years 1977-1981. In accordance with stipulations of the agreement both academies will carry out scientific cooperation in the following directions: the conduct of joint investigations, exchange of scientific workers for the purpose of the conduct of scientific research dealing with social sciences and humanities, organization of scientific meetings on themes of mutual interest; exchange of information about scientific policies and management of scientific research.

As cooperation develops, the two parties will consider a possibility of the conduct of research through the establishment of joint research groups. For the realization of cooperation, both academies will exchange annually, on the basis of agreements, not involving foreign exchange scientific workers for 2-week sojourns for the purpose of delivering lectures, consultations and exchange of experience, and 3 to 4 junior scientific workers for longer stays for the purpose of carrying out research and training in the field of social sciences and humanities.

The agreement has been concluded for a period of 5 years and will be extended for the next 5 years if not renounced by one of the parties 1 year before the expiration of its validity.

On 7 May 1976 a protocol was signed in Warsaw on talks about scientific cooperation between delegates of the Polish Academy of Sciences and the Royal Swedish Academy of Sciences. Both delegations have established that the coordination between both academies during the period from 1 July 1976 through 30 June 1977 will deal with the following problems: electronic properties of metals; biological investigation of active polysaccharides; the central nervous system; and functional analysis. The cooperating scientific institutes will work out working plans, determining the range of cooperation and obligations of each party, periods of realization of tasks and persons responsible for cooperation.

Both parties will exchange annually scientific workers for the period of 10 weeks for consultations, delivery of lectures and participation in scientific meetings, and for a period of 15 months for longer sojourns for carrying out scientific research.

The protocol was signed by First Deputy Scientific Secretary of PAN, Prof Dr Tadeusz Orlowski and Secretary General of the Royal Swedish Academy of Sciences, Prof Dr Carl Gustaf Bernhard.

On 18-21 May 1976 preliminary talks took place in Warsaw between a delegation of the Polish Academy of Sciences and that of the National Center of Scientific Research (CNRS) of France for the purpose of coordination and signature of the Protocol on scientific cooperation during 1976-1977.

Both parties have reviewed the results of the heretofore cooperation and stated that it developed especially favorably in the following fields: the study of the structure and electronic properties of solid bodies; complex automation; mechanics; catalysis; study of the structure and modification of polymers; geophysics and geodynamics; molecular biology. The delegations have coordinated the program of joint research for 1976-1977, specified in the annex of the protocol. The program comprises 58 themes grouped in 22 problems. The majority of problems and themes continue previous cooperation. Both parties stressed the need for coordination by the cooperating institutes of working plans relative to the joint research. It was also decided to continue the plans relative to the exchange of information and scientific documentation, between the Center of Scientific Information of PAN and CNRS Documentation Center, and relative to the introduction of the results of scientific research, between the Center for Patent Protection and Utilization of Scientific Research of PAN and Agence Nationale de Valorisation de la Recherche (ANVAR) CNRS. On the basis of a separate agreement the cooperation will be continued for the joint publication of the second and third volumes of the collected works of Nicolaus Copernicus.

During 1976-1977 the PAN and CNRS will cooperate in the organization of scientific colloquiums on the subject of rheology and plasticity and on the subject of the control of administration, which will be held in Poland, and on the subject of catalysis, which will be held in France.

Both parties have established a total annual credit for the exchange of scientific workers in 1976 in the amount of 600,000 zlotys in Poland and 120,000 francs in France. The credit is earmarked in the first place for trips connected with carrying out research tasks resulting from working plans. In 1977 the total credit can be increased if required by the program of joint research.

The protocol of talks on scientific cooperation between the Polish Academy of Sciences and the National Center of Scientific Research in France for 1976-1977 was signed by President of PAN Wlodzimierz Trzebiatowski and Director General of CNRS Bernard P. Gregory.

Distinctions and Honors

On 1 June 1976, at the session of the General Assembly of the USSR Academy of Sciences, the president of PAN, Academician Wlodzimierz Trzebiatowski, was elected as foreign member of the USSR Academy of Sciences.

The distinction of foreign member of the USSR Academy of Sciences was also conferred upon Academician, Secretary of Department Four of PAN Technical Sciences Maciej Nalecz.

The vice president of PAN, Academician Szczepan Pieniazek, was elected on 25 February to foreign corresponding member of the Agricultural Academy of France.

In May 1976, Academician and Secretary of the Department of Agricultural and Silvicultural Sciences of PAN Bohdan Dobrzanski was named member of the Hungarian Academy of Sciences.

In recognition of a great contribution to the development of world ophthalmology, Corresponding Member of PAN Tadeusz Krwawicz, received a diploma as member of Academia Ophthalmologica Internationalis. The academy is composed of 50 members selected from ophthalmologists all over the world. Prof Tadeusz Krwawicz also received the title of Doctor Honoris Causa of the University of Budapest and the distinction of being made an honorary member of the Czechoslovak Ophthalmologic Society.

In May 1976, German Academy of Natural Sciences Leopoldina elected Hugon Kowarzyk, corresponding member of PAN, member of the Academy.

Corresponding Member of PAN Witold Rudowski was elected on 14 January 1976 as foreign member of the Academy of Surgery of Paris.

In March 1976, Corresponding Member of PAN Mirosław Mossakowski was named corresponding member of the Mexican Institute of Culture in the Class of Behavioral Sciences.

In December 1975 Academician of PAN Kazimierz Urbanik was elected, as a first Polish mathematician, full member of the International Statistical Institute, the highest international organization in the field of calculus of probability.

Academician of PAN Adam Smolinski was named fellow of the Institution of Electrical Engineers in London.

At the meeting of the General Assembly of the International Neuropathological Society, held on 3 April 1976 in Cambridge, Corresponding Member of PAN Mirosław Mossakowski, was elected vice president of this society. The term of office of the society is 4 years. Professor M. Mossakowski has been, since 1972, president of the Society of Polish Neuropathologists, which since 1967 has belonged to the International Neuropathological Society.

At the Congress of the International Federation of Automatic Control, IFAC, in February 1976, Academician of PAN Maciej Nalecz was elected anew to the Executive Council of the International Federation of Automatic Control IFAC for a term of office 1976-1979.

The Council of Directors of the European Center of Coordination and Documentation in the Field of Social Sciences in Vienna, at its meeting in Paris on 7 May 1976 once again elected Adam Schaff, academician of PAN, to the chairmanship of the Council of Directors for a 3-year term.

Participation of Polish Scientists in Scientific Conferences

On the invitation of the National Science Foundation, Academician of PAN Robert Szewalski on 15 February 1976 departed to the United States. He delivered at Brown University a cycle of lectures on the subject of turbine engineering and new conceptions about the increase of efficiency of power units.

Corresponding Member of PAN Lech Wojtczak sojourned from 7 to 19 March 1976 in Zurich where he delivered lectures relative to biochemistry of membranes at a course organized by the European Federation of Biochemical Societies, FEBS.

Director of the PAN Institute of Ecology, Prof Romuald Klekowski participated in the International Conference on "Bioconversion" which was held in Washington on 8-9 March 1976.

PAN Academicians Ignacy Malecki and Leonard Sosnowski took part in the International Conference on "Physics in Industry" which was held 9-13 March in Dublin. Prof Malecki delivered a plenary report at the conference.

At the conference entitled "Physical Chemistry of Molten Metals" held in Koenigstein (Federal Republic of Germany) on 10-12 March 1976, Corresponding Member of PAN Bohdan Baranowski delivered a report on the "Absorption of Hydrogen in Palladium Hydride Under High-Pressure Conditions."

Corresponding Member of PAN Leszek Filipczynski took part in the 23rd International Congress of Electronics which was held in Rome on 23-24 March 1976. He participated moreover in the roundtable discussion, at which he delivered a lecture entitled "The Biosensor."

At the Second International Congress of Quantum Chemistry which was held in New Orleans between 19 and 24 April 1976, Corresponding Member of PAN Włodzimierz Kolos delivered a report entitled "The Theory of Remote-Range Interactions."

PAN Academician Ignacy Malecki took part in the Sixth Conference on Acoustics at which he delivered a report entitled "The Use of Phonon Representation in Acoustics" (Budapest, 21-27 April 1976).

PAN Academician Władysław Fiszdon took part in the Meeting of the Committee of the Program of International Union of Theoretical and Applied Mechanics IUTAM which was held in The Hague on 28-29 April 1976.

PAN Academician Włodzimierz Michajłow and Corresponding Member Adam Urbanek took part in the Conference of Biologists of the Academies of Sciences of Socialist Countries, held in Moscow 2-7 May 1976.

PAN Corresponding Member Maciej Wiewiórowski participated in the conference on "Synthetic Nucleosides and Polynucleotides" which was held in Göttingen between 3 and 5 May 1976.

Within the framework of the exchange between PAN and the National Academy of Sciences, PAN Academician Jan Michalski on 2 May 1976 made a trip to the United States where he delivered a series of lectures on the subject of the chemistry of organo-silicon compounds.

Achievements of PAN Institutes

Device for Continuous Recording of Changes in the Content of Fluid Media

The TECHPAN Experimental Department of the PAN Institute of Fundamental Problems (a team composed of: Dr Engr Stanisław Grabiec, Magister Engr Andrzej Skierski, Dr Engr Eugeniusz Lubaszka, Docent Dr Ireneusz Janczarski, Magister Engr Zdzisław Tokarski, Magister Engr Jerzy Grygorczuk, Engr Jerzy Gorniak) has produced the prototypes of devices for continuous recording of changes in the content of fluid media. A set of these devices, adapted to work under industrial conditions, makes possible a continuous recording of changes in the content of drinking water, industrial effluents, fluids occurring in the processes of chemical technology, etc.

A device for continuous recording of changes in the content of fluid media consists of a six-channel electrometric amplifier placed together with a feeder and an airtight casing of a six-channel recorder along with six measuring electrodes. It is characterized by small over-all dimensions, small weight and simplicity of measurement. The cost of the device is low as compared with similar foreign devices.

One of the manufactured prototypes has already been installed in the Warszawa Steelworks on the spot where the pickled effluents neutralized by the milk of lime are channeled toward the city sewage system or for internal utilization. The device was intended for a continuous control of the process of neutralization of effluents. During its half-year exploitation under conditions of a strong corrosive influence, the device functioned continuously and without breakdown. The management of the Warszawa Steelworks has confirmed the usefulness of the device for an automatic control of the neutralization of effluents and proposed that its installation be made permanent.

The TECHPAN Experimental Department intends to install another specimen of the device for continuous recording of changes in the content of fluid media, with a similar task of the control of effluents, in the nitrogen plant in Puławy.

Moreover, one of the prototypes of the device is at present being tested at the water intake model station of the Stolica Design Office in the vicinity of the Bug-Narew dam in Debe, in order to control the processes of drinking water purification.

Installation of this type of devices is of great importance for environmental protection since it prevents the penetration of the non-neutralized effluents into rivers and water reservoirs.

High-Temperature Calorimeter

The UNIPAN Experimental Department of the Manufacture of Scientific Equipment, in cooperation with the PAN Institute of Physical Chemistry, has developed a high-temperature calorimeter intended for direct measurements and recording of the energy and thermal power associated with various processes, reactions and changes--chemical, physicochemical, biological, etc. It also serves to determine thermal properties of substances and processes as a function of temperature, pressure and concentration of reagents.

The calorimeter developed is an independent measuring system at which output we obtain directly and almost immediately the energy and thermal power of the investigated process or their changes. The measuring system developed is intended to satisfy the ever increasing requirements for determination of thermodynamic parameters of various substances, and changes in processes under real conditions of their course, which in turn is due to an increase of technological requirements and the development of optimization methods of industrial processes.

The expression in the designed calorimeter of all thermal elements of a feedback realized electronically, decidedly accelerates the operation of the calorimeter, improves the stability of work of the system, and makes its functioning independent of the external thermal interference. Thanks to the complex solution of the whole system and automation of the majority of functions, necessary to determine thermal effects in the traditional calorimeters, the device in question does not require highly qualified servicing personnel.

The device developed is of great value for research laboratories, institutes and higher schools, and for research back-up facilities and control of production in chemical, metallurgical, wood and sugar industry, in the manufacture of polymers and artificial fertilizers, and in many other branches of industry. The majority of design solutions is original and for seven of them patents were requested.

Conferences, Symposia and Seminars

Polish-Italian Scientific Seminar

The Polish-Italian Seminar devoted to the theory and applications of the systems analysis was held between 26 and 31 May 1976 in Bialowieza. It is

a new, rapidly developing method of the complex investigation and control of the complex socioeconomic undertakings, which makes use among other things of the achievements of mathematics and cybernetics.

The PAN Institute of Organization and Control and the Ministry of Science, Higher Education and Technology, together with the Italian Center of Systems Research of the National Center of Scientific Research, were organizers of the Seminar.

Protection-of-Environment Problems

The Scientific-Technical Conference on the subject of physicochemical methods of purification of water and effluents was held on 8-9 May 1976 in Lublin. The 128 participating specialists represented all scientific institutions and industrial enterprises. It was the first meeting devoted to the possibilities of the use of physicochemical processes for making water drinkable and for purification of effluents.

The reports presented dealt with ready technological processes worked out on a large laboratory scale; it was emphasized that in many cases chemistry permits the recovery of water, leading as a consequence to closing water cycles in industrial enterprises and to recovery of raw materials and even products from the effluents. Moreover, the problem was presented of the protection of environment in the Lublin Coal Basin. Discussions were also continued in technical sections.

The conference was organized by the Lublin Branch of the Society of Engineers and Technicians of Chemical Industry, the Department of Chemical Technology of the Institute of Chemistry of the Maria Curie-Sklodowska University, and by the Biprowal Design Office of Water Economics and Waste Water Disposal from Warsaw.

Symposium of Cyberneticians in Zakopane

A symposium on the subject "System--Modeling--Control" organized by the Lodz Branch of the Polish Cybernetic Society and the Electronic Computing Technology Center of the Lodz Polytechnic was held from 24 to 28 May 1976 in Zakopane.

Cyberneticians from all over Poland and 30 scientists from socialist countries took part in the symposium. Among those present were such well-known specialists as Prof A. V. Kalyayev, rector of the Radiotechnical Institute of Taganrog, academician of the USSR Academy of Sciences, Y. Pukhov, from the Kiev Institute of Electrodynamics; and Prof V. I. Kostyuk, prorector of that institute.

Several dozen reports devoted to the most topical problems of cybernetics were delivered.

Critical Metals

The PAN Department of Technical Sciences and Committee for Metallurgy and Science of Materials organized on 31 May in Warsaw scientific organizational conference on the subject of "Critical Materials." Deliberations were devoted to the establishment of methods of the effective action in order to decrease the scarcity of the selected metals.

The conference was attended by representatives of the national scientific research centers, by scientific workers, and representatives of the army. Deputy Head of the Department of Science of the PZPR Central Committee Prof Jan Rychlewski, was also present.

Reports were delivered by: PAN Scientific Secretary and Academician Jan Kaczmarek, on "Tasks and Possibilities of Scientific Research in the Decrease of Scarcity of Metals"; by Vice Minister of Materials Management M. A. Zdzislaw Deutschman on "Topical Problems in the Management of Materials in Poland"; by Prof Stanislaw Przegalinski on "Steels Resistant to Corrosion"; by Prof Roman Wusatowski on "Critical Products of Metallurgy and Metallurgical Processing"; by Prof Wladyslaw Rutkowski on "The Role of Powder Metallurgy in Economizing Metallic Critical Materials"; by Prof Jan Golonka on "Electrolytic Copper"; by Docent Dr habilitatus Zbigniew Misiolek and Dr Engr Stanislaw Sobierajski on "Evaluation of Trends in the Development of Zinc-Lead Industry in Light of Rational Utilization of Reserves"; Prof Zofia Orman and Prof Marian Orman on "Critical Metallic Materials on Aluminum Base"; PAN Academician Adam Gierek on "Technological Aspects of Saving or Increase in Production of Materials"; General Division, Docent, Dr habilitatus Jerzy Modrzewski, on "Some Postulated Research and Developmental Problems Involving Metallic Articles of Non-catalog Production"; Docent Dr Ryszard Mierzwinski and Docent Dr Marian Soltysik on "Interrelations: Materials--Labor--Production in the System of Evaluation of the Results of Management (with special reference to the management of metals in Poland)."

Directions of the Application of Thermography in Poland

The Center of Scientific Information and Technical-Organizational Progress ("INTORG") in Szczecin, in cooperation with the Szczecin Polytechnic, organized on 22 June 1976 in Szczecin a nationwide symposium on the subject of "Directions of the Application of Thermography." The purpose of deliberations was to analyze the possibilities and conditions of a wider application of thermography in the science and economy of Poland. Specialists from all scientific centers of Poland took part in the symposium.

The following reports were the subject of discussion: "Fundamentals of Thermography and Possibilities of Its Applications" (Dr G. Rudowski, Military Technical Academy, Warsaw); "The Use of Thermography in Medicine" (S. Gorski, Magister, Academy of Medicine, Poznan); "The Use of Thermography in Diagnosis of Vibration Disease" (S. Gorski, W. Fibiger and

M. Sikorski, Academy of Medicine, Poznan); "The Use of Thermography in Scientific Investigation in Industry" (J. Klosowicz, Magister, Engr, Polytechnic, Poznan); "The Use of Aerial Thermal Pictures in Hydrological and Geological Investigations" (Dr A. Ciolkosz, Institute of Geodesy and Cartography, Warsaw); "Directions of Research Activity of the Thermographic Laboratory of the Electrotechnical Institute" (A. L. Jankowski, W. Adamczewski and J. Zawiejski, Warsaw); "Thermography as a Method of Investigation in Metallurgy" (Dr G. Rudowski); "Possibilities of Diagnosing the Regularity of Shipborne Internal Combustion Engines in Ship Power Plants" (Prof H. Dziewanowski, Polytechnic, Szczecin).

Moreover, a Swedish motion picture dealing with applications of thermography in medicine was shown and the thermographic equipment was displayed.

The full texts of reports will be published separately.

Cultivation of Rye Varieties

An international seminar and a working conference on the subject of "Biochemical and Technological Investigations of the Quality of Rye Grain" were held in Radzikow near Warsaw on 26 and 27 May 1976. The seminar was organized by the Institute of Cultivation and Acclimatization of Plants, which is the international coordinator of the program of investigation and cultivation of rye in the CEMA countries.

The seminar was attended by specialists and scientists from Czechoslovakia, the GDR, Poland, Romania, Hungary and the USSR. The purpose of deliberations was to discuss the problem of standardization of methods of biochemical and technological evaluation of the quality of rye. In many countries one sees a tendency toward greater consumption of rye bread and therefore a need arose for growing rye varieties with greater protein content and for improving its milling value and consumption-nutritional quality.

Conference on Applications of Computers

The Institute of Organization and Control of the Polish Academy of Sciences and of the Ministry of Science, Higher Education and Technology, together with the International Institute of Applied Systems Analysis (IIASA), organized a scientific conference in Zaborow near Warsaw between 31 May and 4 June 1976, devoted to the exchange of experience in the field of computer networks and applications of computers.

The conference was attended by Polish specialists and others from 12 countries and by the director of IIASA, Prof Rober Levien.

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CSO: 2602

COMPUTERIZATION OVER PAST DECADE OUTLINED

Warsaw INFORMATYKA in Polish Vol 11 No 4, April 1976 pp 25-29

[Article by Andrzej Targowski, Warsaw]

[Text] The past decade is a good period over which to present an outline of the installation of computers in Poland. As a matter of fact the basic development of computer stock occurred precisely during this period. This article does not pretend to be an exhaustive historical compendium, it is about something else. In fact by undertaking arbitrarily a review of the past ten-year period and describing the process of quantitative and qualitative expansion of computer stock, we can thus explain causes which shaped its picture.

We shall deal chiefly with problems connected with hardware which during the past decade has been imported from abroad. While not denying the considerable role which the hardware produced in Poland has played, we shall leave this problem in the background, since it has already been discussed exhaustively in articles printed in INFORMATYKA. Moreover, the imported computers not infrequently blazed the way to Polish information science by solving basic problems and training cadre, thus permitting a smooth transition to computers produced in Poland. Since many controversies arose during production and importation of computers, we may, therefore, expect that when making an attempt at the appraisal of the past period they may appear again.

Most frequently the objection raised was based on heterogeneity of the computer stock, which was considered as harmful and capable of being avoided by advancing the concept of equipment with computers of a single type. Without attempting for the time being to take an attitude toward this objection, it is necessary to remember that only today, from the perspective of long experience, is it possible to form a retroactive idea about this. Advances in operation and production of the computer hardware are extremely dynamic, rapid and spontaneous. The fact that computer stock in Poland represents a heterogeneous mosaic is the result of a certain historical necessity.

Pioneering Period up to 1966

In the beginning of the development of Polish information science of special importance was the resolution of the Economic Committee of the Council of Ministers concerning the complex development of the electronic computing technology (1961), which gave the stimulus to the development of the production of computer hardware in Poland (work at the Warsaw Polytechnic, Wroclaw Electronic Plants and Institute of Computers of PAN on Polish computers UMC, ODRA, ZAM), and, in the field of applications, initiated the introduction of computers in the Polish National Bank, in the Kasprazak Plant and Rosa Luxemburg Plant in Warsaw.

The first foreign computer installed in 1961 at the Institute of Electronics in Miedzylesie, was the Elliott 803, one of the earliest European computers built on transistors with excellent programming autocode MARK and external sequential magnetic-film mass storage. Both this computer and the computing center, which was transformed subsequently into the Central Departmental Data Processing Center, rendered great services in that period, especially in the propagation of information science and training of the first cadres of programmers (almost 1,000 persons were trained).

The universality of the computer is evidenced by the range of the introduced systems; from optimization calculations concerning loss of copper in a certain class of engines (benefits of this system brought about complete amortization of the computer within a year's time) up to investigation of the syntaxis of the poetry of Mickiewicz. Following the example of Miedzylesie, computers of this type were purchased by the Gdansk Central Shipbuilding Office and Wroclaw University (they are still in operation) and considerably later (Elliott 905) by the Higher Marine School in Szczecin.

Another type of computer which made a contribution in the pioneer period was the Danish GIER imported by the Department of Numerical Calculations of the Warsaw University and by the Institute of Nuclear Research in Swierk, equipped with translator ALGOL, somewhat slower but reliable and still in operation in those two institutions (chiefly scientific and training computations). The interesting thing about GIER was its random-sequential mass store, so-called carrousel store, consisting of 64 short magnetic tapes. At the same time the ZUSE 23 (ELWRO) computer was purchased, which, unlike the previously mentioned computers, proved to be not a very good purchase.

The computers mentioned above, as well as the Soviet computers URAL-2, were actually useful in numerical calculations, whereas the economy urgently needed hardware adapted to data processing (applied to management needs).

The attempts at processing using the already installed computers did not bring about the desired results, whereas perforated card machines (MLA) used for this purpose could not satisfy the rapidly increasing requirements of this field.

Meanwhile, in the 1960's, discussions on the usefulness (or nonusefulness) of their continued operation were carried on not only in Poland. It all began in France where the failure experienced with the high-speed super-computer, GAMMA 60, led to different solutions. It was the SERIE 300 which in its version with a central unit was a computer (MCT-300) and without it was the MLA system with a processing cycle twice as fast as previously (300 cards/min). In its computer version the MCT-300 could also be supplemented with tape memory. The reading apparatus--card puncher for repeated card reading, classification and inclusion of punched cards in the pertinent file--was something of a novelty. Having at one's disposal two such reading apparatuses one could bring up to date the punched card files just as they are being updated on a magnetic tape.

Thus, in 1963, both the expanded version MCT-300 (for the Chief Center of Mechanized Computation of the Polish State Railroads) and the limited one (for the Polish National Bank) were purchased and it must be admitted that--aside from their practical advantages--these machines were responsible for training a great part of the cadre of the Institute of Machine-Building Organization and the Kasprzak Plant, and then of the newly established ZOWAR [Computing Center (?)].

Specialists trained in applications of this hardware played a role in the field of data processing similar to that played by the cadre of designers in the first laboratory work which produced numerous designs for Polish computer hardware.

In order to cope with the growing need for data processing suitable hardware was necessary. In the middle of the 1960's we experienced a situation similar to the present one.

Everyone was thinking in terms of the need for typical hardware in the same way as today we set our hopes on the Unified System. For a couple of years the then legendary ZAM 41 was the "computation machine" present in the majority of investment plans. In the meanwhile the first pilot systems mentioned in the KERM [Economic Committee of the Council of Ministers] resolution had to be solved with the use of imported hardware. Unexpectedly, in 1965, the International Labor Organization presented to the newly organized CODKK [Central Institute for the Advanced Training of Computer Personnel] the British ICT 1300 computer. "Never look a gift horse in the mouth." Therefore we will not wreak our malice upon this nontypical model which, in a rather key position, could not completely fulfill the function for which it was primarily intended. Only in 1974 was this computer replaced by the IBM 360/50 which is intended for research in information search and for control games. However, to do justice we have to say that CODKK trained hundreds of system designers through use of the above mentioned ICT 1300, which is a valuable achievement. But the fundamental breakthrough in designing and programming of data processing systems occurred in connection with the installation in 1966 of the NCR-315 computer in the Polish National Bank and the IBM 1440 computer

in the ZOWAR. The first was a system designed par excellence for bank systems and is the world's most popular in this domain. It would be, however, a great exaggeration to propose this computer as a model installation. With this computer is associated an extremely interesting question concerning selection of the conception of random access mass memory. The NCR-315 was equipped with a CRAM memory on magnetic cards, which was at that time the alternative for magnetic disks. Disputes in Poland relative to "cards or disks" were then extremely vehement, since it was exactly the computer of ZOWAR, the IBM 1440, that was equipped with disk memory. Practice showed that despite a two or three times slower operating memory than the ICT 1300 the IBM 1440 computer, as an electronic data processing system for the Starachowice Truck Factory, processed inverted large matrices twice as fast, while performing this equally as rapidly as the ICT 1904. In order to make things perfectly clear we will add that the above mentioned electronic data processing system operates on the IBM 1440 more rapidly than on the IBM 360/50. This confirms the well-known fact that the operating system of the IBM 360, while facilitating the operation of the computer, at the same time prolongs the time of the computation itself. Based on the IBM 1440, for the first time in Poland production planning and control systems (with assembly automation) were created in the Starachowice Truck Factory, the automobile factory in Zeran, and in the Nowotki Plant. At present the two first factories process their own IBM 360, and the third one is preparing to install a Unified System Computer.

By joint decision of the first commissioner of the government for electronic computing technology, E. Zadrzynski, and of the Planning Commission, the ZETO [Computing Center] network received in 1966 a Minsk 22 (later 32) computer which generalized the use of data processing in centers other than Warsaw. With this the pioneering period was at an end. In Poland, there were installed at that time a score of digital computers and only a few for data processing (including the SERIE 300). This number was absolutely unsatisfactory to meet the requirements. Only the forthcoming decade and actually the last 5-year period produced a considerable increase in the number of computers, leading to the present when we have about 1,000 of them.

Wait-and-See Period (1966-1971)

The information science formed in the pioneering period was already quite developed, permitting the formulation of postulates in the sphere of general information problems.

Instead of continuing the production of ZAM, the ELWRO [Wroclaw Electronic Plant] began the production of the ODRA 1304. There were sporadic cases of purchasing foreign hardware. Among other things the Honeywell 3200 was purchased for the Nitrogen Industry association in Krakow (the present Petroinform), a few computer installations of the ICL 1900 series were added, as well as the ICL System 4, these latter intended for shipbuilding and the steel industry.

The more-than-five-year activity of the second management structure of the PRETO [Commissioner of the Government for Electronic Computing Technology] Office did not create a program for the development of information science. The Committee for Science and Technology, acting at that time, ordered the elaboration of such a program. Parallely the group of social activists worked out an alternative program, putting in the forefront the question of minicomputers and data recorders on magnetic carriers and formulated the concept of some 20 pilot systems. The program of this group was approved by the Plenum of the Committee for Science and Technology and then the directions of action were confirmed by the Presidium of the government. Ten years after the previously mentioned Resolution of the Economic Committee of the Council of Ministers, information science has at last obtained a programmatic document of essential nature.

Period of Programmatic Development of Information Science (from 1971)

Along with the post-December transformations, information science was also given a green light. To assume the increased tasks, information science was ready on the programmatic side. In the Party-Governmental Commission for the Modernization of the System of the Operation of Economy and State there is a group which is entirely devoted to information science. There is no need anymore to convince anyone about the rank of information science, the question is only to elaborate a model of its development in the modern socialist economy and to incorporate it into other systemic solutions of the economy. The interest in information science shown by this commission exerts an influence on the decision of the Planning Commission in the matter of the allotment of funds and activates the users. Today after completion of the 1971-1975 Five-Year plan we can assert that this climate caused the planned goals to be exceeded almost twofold. The purpose of this document was to enliven or rather awaken requirements of information science and this has been achieved.

The control over implementation of the program was entrusted to the Ministry of Science, Higher Education and Technology, created to help the All-Polish Information Science Office (in operation for 1 and 1/2 years). At the same time the PRETO Office was abolished and its reorganized departments were attached to the Committee for Science and Technology, and shortly thereafter to the Ministry of Science, Higher Education and Technology. Also, a new version of the five-year plan was created in which for the first time reference was made to information science. The strategy of the selective development of the economy was replaced by the strategy of its harmonious development. As regards information science it was a turn for the better. The point was to install computers where they were most needed and to form them into a well-considered whole. Based on this assumption the All-Polish Information Science Office came out with the idea of the creation of the All-Polish Information Science System which was the materialization of the general purposes of information science in the socioeconomic system of Poland.

The Polish industry, following the world trend in the development of mini-computers, has produced a score or so of Odra 1325 and several hundred MERA 300, which can solve smaller computation problems with use of BASIC language. If we would catalog all that was purchased for the performance of digital computations, regulate principles of the turnover of software and utilization of hardware, and equip the expected Polish MERA 400 minicomputers with software adapted to the needs of Polish consumers, then the feeling of unsatisfied need, which we still experience, could be alleviated.

There would remain the question of gradual generalization of data processing systems in the very work of planners, designers, technologists, economists and others. The automatic systems of control of technological processes, the development of which is coordinated by the Department of Complex Automation of PAN in Gliwice were initiated with a dozen or so pilot systems based on imported hardware. Selection of the computer was each time decided by the achievement of the firm offering specialized hardware in the given field of industry. The choice of a single supplier would make no sense. In addition to the imported hardware, the Polish ODRA 1325 and MJKs 25 are proposed for simpler systems.

The greatest lag has occurred as regards hardware for remote data processing. During a period of stagnation (1966-1971) we had to rely on hardware which was nonprogrammed and not adapted to cooperation with terminal devices. Often these terminals were simply lacking. Poland was at that time probably the only country participating in the work on the Unified System which for a long time did not even have a single IBM 360 computer for this purpose. The first to receive it was ZOWAR, then the motorization industry, and finally the Institute of Computers. A French IRYS 80 supercomputer was also purchased.

In the period in question there came into being three multicomputer centers presaging the first Polish hierarchic systems. In the State Power Distribution Agency, the CDC 3170 and CDC 1700, which had already been tried in other places for similar tasks, began to function. The PETROINFORM of Krakow added model 2040 to its HONEYWELL 3200 and the National Bank of Poland expanded the NCR 315 by adding two NCR 615. Thus the material prerequisites were established for the creation of hierarchic systems which are so much written about and realized abroad. And again we will say that the equipment of these centers is dependent on one hand upon historical development and on the other hand on the specificity of the individual systems and specialization of suppliers.

In the realization of the concept of harmonious development of information science we may note some important events. In the Commission for Planning a UNIVAC 1106 computer was installed (for CENPLAN), at present the State Center of Information Science (PESEL) has installed a SIEMENS 4004, and one RESPLAN is being constructed based on the HONEYWELL 6035. Moreover the RESPLANs are being formed in the Ministry of Foreign Trade, Ministry of Light Industry, and Ministry of Mining and Power (UNIVAC 1106) along with a great undertaking in the Ministry of Machine Engineering Industry (IBM 370).

As concerns computer installations of interest to us, their distribution was subordinated to goals for the development of individual systems, i.e., for professional work (engineering, economic, medical, educational, etc.), for the control of technological processes, for enterprises, and finally for state systems, at present called governmental systems. Obviously the latter were most conspicuous, since these were completely new, original solutions in our economy and governmental administration (CENPLAN, RESPLAN, SPIS, PESEL, MAGISTER, WEKTOR). The majority of these systems are still being planned and some are partially in operation.

To begin with we should state that as a result of the policy carried out we have at our disposal in Poland modern hardware which can be used to design and realize any data processing system. This does not mean that as regards the number of installations the computers satisfy the needs of users. But we are not anymore in the situation where (until 1971) modern hardware was known to us only from hearsay.

We should add that the most modern hardware is being used in two and mostly in three shifts. The common misjudgment regarding incomplete utilization of computers in Poland, which prevails in circles evaluating information science, results from the statistical average which treats indiscriminately all computers, including those incompletely programmed or installed in configurations not adapted to the real requirements. It is an altogether different question to continue to coordinate the utilization of the stock, both hardware and software, purchased by us.

At present in Poland we have at our disposal a mixture of computers which in great measure is analogous to the structure of the world's stock. Let us consider whether this heterogeneity of hardware is a disadvantage or an advantage.

As for digital computations we have at our disposal the subscriber system CYFRONET equipped with two CDC CYBER 72 computers, classical for this system, which are among the most rapid in Europe. Instead of 100 or 200 terminals, they have only a dozen or so, but it is at least possible to subconnect more of them when funds are available. At the same time a score or so of minicomputers was purchased from various firms such as DATA GENERAL, WANG, VARIAN, SINGER, AND HEWLETT-PACKARD. In this class of hardware one should also place some K202 minicomputer units on the basis of which a modern center was created at the BISTYP Design Office, equipped with specialized devices for use in engineering design in construction work. A similar center was also organized in the ENERGOPROJEKT.

The IBM 360 unit was expanded in ZOWAR, where the WEKTOR system and then, partially, the MAGISTER system were put into operation. Since it was not possible to realize the development of multi-access systems of digital computations based only on imported hardware, the All-Polish Information Science Office funded, at the Wroclaw Polytechnic, construction of the WASC subscriber system based on Polish ODRAs 1300 and imported tele-information hardware.

The HONEYWELL 6035, formerly known as GE 635, represents a real breakthrough, a computer which functions in the American subscriber network with over 100,000 terminals and forms the largest service network of the world within the framework of MARK IV.

It is based on this computer model that the first genuine software of the data processing base, forming the basis of the work of the CODASYL group, has been put into operation.

The same concept was responsible for providing software equipment for the data processing bases of our UNIVACs and CYBER 72. Contrary to this concept is the less universal but equally efficient software of hierarchic data processing bases in the IBM system of the Institute of Social Medicine. On the other hand, the PRISMA system of the SIEMENS 4004 computer illustrates how this task may be solved more simply, although less universally.

Differentiation of the computer stock assures the realization of the applied system. It also makes it possible for us to get acquainted with the world's leading software of data processing bases, which we had only heard stories about until now, not to mention the possibility of a thorough training of specialists. Another direction of activities which is slowly beginning to yield results concerns the automation of the search for scientific technical and library information.

The Council of Users of the most important Polish libraries, assisted by the All-Polish Information Science Office, initiated the installation of a tele-information set of IBM 360/50 in the IDDKAP [expansion unknown] and the training of dozens of its workers based upon specific systems. Among other things it is worth to note that ZOWAR has mastered STAIRS, the world's leading IBM information search system. But the greatest surprise has been caused by the Central Medical Library in which Prof Widy-Wirski has put into operation an unparalleled system, whereby The Central Medical Library is directly connected to a computer in Stockholm, making possible, through a conversation system, the retrieval of information recorded in the MEDLINE system which is the European version of the MEDLARS system. To the surprise of the Swedes, out of 22 foreign users The Central Medical Library is using the system to the extent of 22 percent. Obviously, this is due in great measure to the extensive reading of our physicians. The system was put into operation using a SINGER 1500 computer.

This project is a good example of how properly selected hardware and its accessibility is solving problems about which so much has been written.

Computers manufactured in Poland and in socialist countries serve as the basic equipment for problem-oriented systems. It is likewise worth noting that the first R20 installations were also imported during this time.

Is the Heterogeneity of Computers a Disadvantage or an Advantage?

Diversity of computers is simply a fact. It was caused on one hand by specialization of computers according to systems (requisite diversity),

and on the other hand by the weight of arguments which were taken into account in each individual case (imposed diversity). As a matter of fact it has not been possible to arrest this process in any country of the world. From the theoretical and professional viewpoint the question of diversity of hardware is not as dramatic as some people want to consider it.

In numerical computations the exchangeability of programs is decided by the programming and the operating memory (we omit here the question of external memory). After all, the urgency of computations of this class is not so great that we could not hold off on them in case of hardware failure.

In the case of data processing systems, whenever the breakdown occurs we need to have a similar item of the set. This requirement is met under our conditions.

The most vital matter in the case of the presence of many types of computers is to ensure a mutual exchange of data. To put it in everyday language: to ensure that the computers are not "deaf." Such an exchange can be insured by the nationwide tele-information network, which is at present in the incipient stage. For the time being this role is fulfilled by the tele-information main Katowice-Warszawa-Gdansk. In these cities it is envisioned to put into operation concentrators to translate codes of different computers connected to the first line of the nationwide network for data transmission. The implementation is carried out based on SINGER 10 computers.

The reaction of Polish users is characteristic. At first, at almost every conference development of the network of data transmission was postulated and its state was lamented. However, when there was a chance to possess something really modern on the worldwide level, the interest decreased. Voices were heard saying there is no need for this type of system. If we look at this question more closely it turns out that the centers with imported hardware prefer to expand it further within the framework of individual data transmission networks based on the hardware... of the existing supplier.

From the economical standpoint one should prohibit the building of individual networks and obligate all users to utilize the universal network.

Consequences of Past Development

As follows from the above review we have to note many successes and valuable initiatives in the domain of the application of information science. Whereas the pioneering period introduced a number of initiatives, the stagnation in information science during a very long 5-year period (1966-1971) produced great lags which we will not be able to remove soon enough. The period after 1971 is the period in which supplies of most modern hardware were begun and work was undertaken on the most important systems in the economy. But we must remember that the basic outlook of Polish information science is being shaped by the Polish hardware supplier.

For the good of both producers (we think that they could also use some criticism) and users, the activation of the latter is necessary, especially that of their clubs and associations.

They should more effectively influence the shaping of the configuration of domestic hardware in accordance with present worldwide trends and long-term needs of domestic users.

In the present outline we have presented the most important circumstances associated with installation of computers.

To be sure many a question has been omitted but without intending to do so. Perhaps some readers would have something of interest to share with us in the columns of INFORMATYKA. We invite them cordially to send us their views.

If there were an increase in such correspondence, we could consider devoting a special column to it entitled "From Experiences in the Installation of Computers."



Photo 1. UMC 10 of Warsaw Polytechnic, predecessor of ODRA series computers

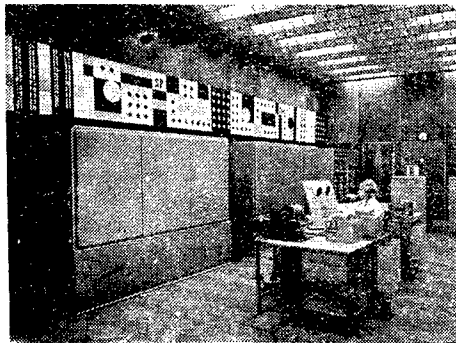


Photo 2. ZAM 2, followed the XYZ computer--precursor of ZAM 21 and ZAM 41

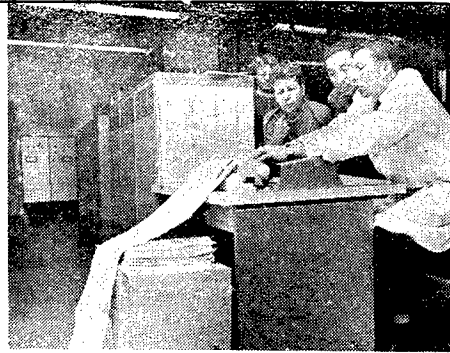


Photo 3. Banking computer NCR 315--one of the first computers for data processing installed in Poland



Photo 4. IBM 360 in the former ZOWAR premises, first installation of this type in Poland

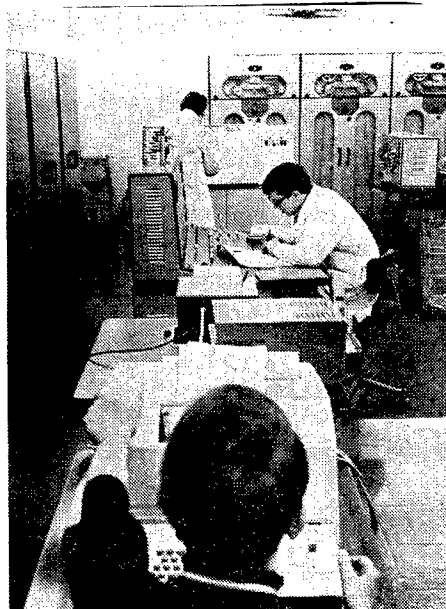


Photo 5. One of the most popular computers in Poland--MINSK 22, replaced later by MINSK 32



Photo 6. First Polish minicomputer K 202

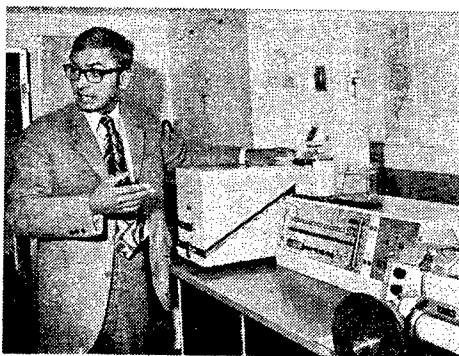


Photo 7. ELLIOTT 905 on the "Prof Siedlecki" ship, continuator of of traditions of continental computer ELLIOTT 803

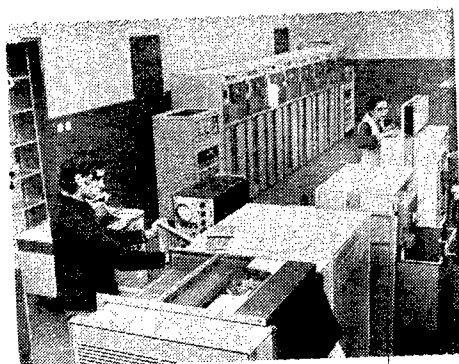


Photo 8. ODRA 1305, rival of R 30

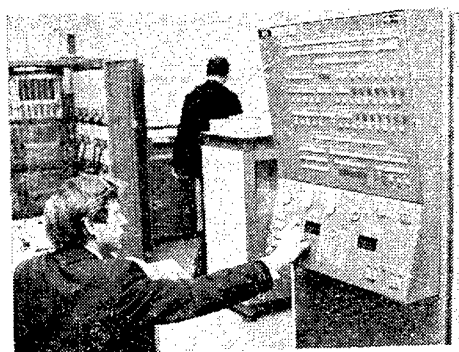


Photo 9. R 20--the harbinger of a new hardware era

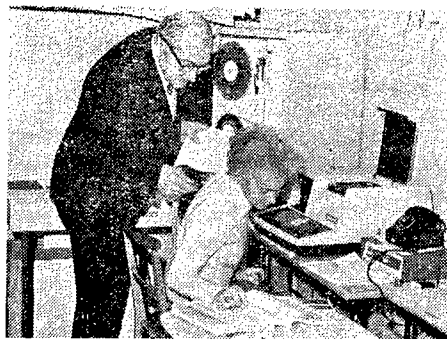


Photo 10. Prof Widy-Wirski and Magister Tylman, during computer conversation (SINGER 1500) between Central Medical Library in Warsaw and Central Office of MEDLINE system in Stockholm

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